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SOURCE Rybnoye Khozyaystvo, No 10-11, 1946.THE FISH INDUSTRY OF SOUTH SAKHALIN

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The fish industry of South Sakhalin is considerably more productive than that of the northern part of the island.

The Japanese competently and intensively exploited the fish resources of South Sakhalin. Their catches (according to Japanese statistics) are shown in the following table.

Total Catches (in 1,000 Centners)

Years	Herring			Salmon			Mintay (?)	Flounder	Crab	Sea Kale	Others	Total
	Spring	Summer	Young	Humpback	Siberian	Cod						
1941	1,555	538	779	200	31	300	180	78	5	191	126	3,924
1942	1,680	438	14	20	13	174	111	143	19	238	80	2,934
1943	1,519	194	514	105	7	169	126	107	36	390	60	3,227
1944	1,691	76	348	28	5	118	52	192	20	281	63	2,874
1945	890	---	200	80	20	---	200	200	20	40	160	1,840

The catches were even higher in some years (1928-1931), reaching nearly 6 million centners.

Industrial catches included herring, cod, salmon, flounder, mintay (?), navaga, goby, and other fish. Sardines were also caught in considerable quantities. In addition to fish, great importance was attached to crab, echinoderms, mollusks, etc. (about 150,000 centners annually), as well as to sea kale, and anfel'tsiya (?) production (about 400,000 centners).

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Herring comprised about 70 percent (and in some years, up to 90 percent) of the total catch. The type of herring which in the spring migrate from the Sea of Japan to the southern and western banks of South Sakhalin for spawning are most important. They concentrate in these regions in March, but generally do not approach the shore for spawning until the end of April at which time the temperature of the water is 3 - 6 degrees.

There is mass concentration of herring in the spawning grounds but it is very short-lived. It lasts several days, after which time the herring disperse, apparently to the open sea where they feed during the summer and autumn.

The industry takes advantage of the mass spawning runs of herring. Although they are also caught in summer and autumn, the quantity does not compare with that caught in the spring.

Until 1934, the main body of herring spawned on the southern shore around Aniva Bay. After 1934, for unknown reasons, the herring left this region and used the western banks for spawning.

In summer, a vast number of young herring (new-born and yearlings) concentrated in Aniva Bay. The Japanese industry took in as many as 600,000 and more of these young each year.

Migration of herring to the eastern banks of South Sakhalin has been slight and the catches small.

Owing to these migratory characteristics of herring, the main industrial region at present is on the western shore, comprising about 80 percent of the catch; the eastern shore has last place.

Next to herring in importance are cod, the main industry of which also centers on the western shore. Cod are caught in the spring (February-March) and in the autumn-winter period (October - December). Catches of cod have varied greatly. In recent years the catch has amounted to about 150,000 centners annually.

Salmon are represented by three types: humpback, Siberian, and sima (?). The humpback variety produces a catch of about 150,000 centners; the Siberian type, about 16,000 centners, and the sima has no industrial importance. Humpback and Siberian salmon are caught as they approach the spawning rivers of the eastern, southern and western banks of South Sakhalin. Small rivers with sources for feeding are very numerous (over 100), and each of them has its own spawning schools.

Flounder have been caught on the average of about 100,000 centners per year and for the most part, off the western bank. They are also found in the eastern region, but the industry there has not been organized.

Crabs are very important marine products. The annual yield is about 1,500,000 crabs, and in some years it has been more than 2,500,000. Crabs are found all along the shoreline of South Sakhalin, but the greatest catch is in the western region. They are caught the year around, but spring (March - May) is the best season.

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Mollusks have been obtained in large quantities. Bivalves, including maktra (?), scallops and Mytilus have totaled about 30,000 centners and cephalopods, including octopus and Loligo have reached about 30,000 centners. Echinoderms, mostly holothurian, have yielded about 60,000 centners in the western and southern regions. Dehydrated and sun-cured foodstuffs have been prepared from mollusks. A small part of the mollusks have gone into the production of canned goods.

Sea Kale has given the greatest yield among marine plants (about 400,000 centners in dehydrated form). Partially-prepared dried foods have been made from sea kale.

The amfel'tsiya of Lake Tobuti has great importance for the production of agar-agar. Its yield has been about 70,000 centners.

High economic value is placed on the school of fur seals which are kept around Tyulen' Island. Through sound management of the fur-seal economy, the Japanese developed the school to about 35,000, from which 3,000 to 4,000 were taken annually.

In order to take advantage of the short-lived (8 - 10 days) spring spawning of herring, the Japanese set up over 1,800 large and small vertical seines and over 15,000 nets for the catch.

Rapid unloading of herring from seines and transporting them to the shore were required. Kungas (?), outfitted with mesh bags called "waku" were used for this purpose. Such bags, suspended along the sides of the kungas held about 120 tons of herring. The fish were poured directly from the seine into the waku, after which the kungas was towed to the herring receiving point. If necessary, the herring were left in the waku for several days.

At the receiving point, the herring are put onto boats with the aid of an 8-inch centrifugal pump, transferred from the waku into bunkers and then transported in small cars to the processing point. During the spring fishing season, over 1,000 power-driven boats of varied capacity and about 15,000 nonpower craft were used.

The number of fishermen reached 40,000. About 70,000 men were engaged in the fishing industry, of which about 20,000 came from Hokkaido.

The extensiveness of the region and the absence of havens for the fishermen during the frequent storms necessitated construction of shelters. Along the shoreline of South Sakhalin there are 29 such small fishermen's shelter ports. The greatest number of them are in the southern part of the west bank, which is the main region for the herring catch.

The majority of fish-processing methods, in contrast to the technical methods used in catching, are very primitive.

These installations have remained temporary and undeveloped because, for unknown reasons, the herring are apt to shift from one spawning point to another, as they did in 1934, and the possibility of changes cannot be overlooked. Several shifts in the main point of herring concentration in spring are being observed at present along the western shore.

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According to Japanese statistics, the fish were used for the following purposes:

	<u>Percent</u>
Fertilizer	40
Fresh dried herring	25
Feed meal (pishchevaya muka)	10
Salted products	10
Fresh (refrigerated)	10
Frozen products	4
Canned goods	1

Since most of the fish caught, mainly herring, was dried or used for fertilizer, the processing equipment was simple.

Only a small number of herring were salted. In addition, some cod, flounder and salmon were also salted. Salmon (Siberian) and crabs were used chiefly in the production of canned goods.

Cement basins of very small capacity (about 50 centners in the western region) were made for salting fish.

The canning plants for the most part were also very primitive and had small productive capacity.

The refrigerator capacity matched the small quota of frozen products produced by the fish industry of South Sakhalin.

Other marine products, such as sea kale and trepang were processed in natural dryers and did not require special equipment.

There were two large plants at Korsakov and Mers' in South Sakhalin for the manufacture of agar-agar, with a total productive capacity of 130 tons and several small domestic industries for this production. They were all located on the eastern shore of Aniva Bay, not far from Lake Tobuti where the raw material, anfel'tsiya, is obtained.

With regard to the disposition of fish and other marine products, and particularly of herring, the western shore has played the chief role, yielding 70 - 80 percent of the total catch and processed goods. The eastern and southern banks have had considerably less importance.

Distribution of the catch according to the regions of South Sakhalin is shown below:

<u>Years</u>	<u>Yesutorakiy</u>		<u>Kholmskiy</u> <u>(Maokakiy)</u>		<u>Nevel'skiy</u> <u>(Khorotovskiy)</u>		<u>Korsakovskiy</u> <u>(Otcarskiy)</u>		<u>Sikuch-</u> <u>skiy</u>	
	<u>1,000</u> <u>Centners</u>	<u>%</u>	<u>1,000</u> <u>Centners</u>	<u>%</u>	<u>1,000</u> <u>Centners</u>	<u>%</u>	<u>1,000</u> <u>Centners</u>	<u>%</u>	<u>1,000</u> <u>Centners</u>	<u>%</u>
1941	60	1.6	1464	37.2	793	20.2	1470	37.3	146	3.7
1942	39	1.3	1354	46.2	812	27.6	683	23.5	42	1.4
1943	56	1.8	1134	35.1	846	26.3	1061	32.8	130	4.0
1944	51	1.8	1183	41.1	831	29.0	753	26.1	58	2.0

During World War II the material base of the fishing industry of South Sakhalin underwent considerable change. The eastern and southern regions suffered most of all and practically nothing of their shore economy survived with the exception of the fishing ports. The industrial and residential buildings were destroyed or burned to a large extent.

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The western region suffered severely. Workers of the Soviet fishing industry, who arrived shortly after the Red Army occupied this area, quickly took over the industrial buildings, stocks and materials. However, the Japanese had removed a large number of the power-driven fishing boats. Only the low-powered (6 - 10 horsepower) cutters, the majority of which were not in operating conditions, were left behind. In many enterprises (agar, canning, etc.), steam and other power plants were damaged. Many of the cement salting vats were in nonworking condition.

The workers of the Soviet fishing industry set out to reconstruct the destroyed enterprises, putting the remaining power-driven and nonpower boats of the fishing fleet into working order and mobilized that equipment and material which remained.

The Administration of Sakhalin Fishing Industry coped with this problem successfully and exceeded the 1946 plan.

To attain the highest development in the fishing economy of South Sakhalin in line with its raw material resources and the Soviet national requirements for various processed goods, there must be radical reorganization of technical practices:

Personnel

The personnel problem is, at present, the decisive factor in development of the fishing economy of South Sakhalin.

A great majority of the immigrants and recruited workers arriving in South Sakhalin were unacquainted with the techniques of fishing and considerable time was required for them to become skilled workers. In the meantime, the need for skilled personnel had to be filled by transporting an adequate number of fishermen and processing workers from other regions, particularly from the Primorskiy Kray.

Courses have been organized for training brigades and foremen. A technical school for the fish industry was founded in Nevel'sk.

There is also great importance in the development of the industrial activity of the Japanese fishermen who remain in South Sakhalin. The Japanese structure of a fishermen's association, the "Gyokai," was maintained. It is necessary to develop the organization of the fishermen's association to the greatest extent in conformance with Soviet legislation and new economic conditions.

Organization of the Catch

The most important task is rapid construction of a power-driven fleet with adequate capacity which will assure not only the spring catch of herring along the shoreline, but also the open-sea catch of herring, cod, flounder, and others.

The short duration of the spring catch of herring requires several thousand fishermen. A sizeable nonpower fleet (kungas and other types of boats) are needed by them.

Over 300 power-driven and about 800 nonpower boats must be built for the 1947 fishing season.

Also of great importance is the problem of obtaining equipment for the catch as well as miscellaneous items (cordage, cables, mesh bags, etc.). The Japanese brought from Japan all materials needed for the catch; therefore, at present, it is necessary to bring all required materials for constructing and rigging from the continent. Another task in this connection is the stocking up and utilization of local resources.

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The Japanese used a great bulk of the herring for fertilizer, feed meal and fresh-dried products. For this reason, there was no harm in keeping the fish in the waku for several days. But a similar practice is not suitable for the production of salted herring. The unloading and transporting of herring to salting points must be rapid. Installation of an adequate number of pumps for unloading herring from the waku and the installation of equipment (gantries, bunkers and narrow-gauge rail cars) at receiving points on shore are required.

Fish Processing Vats

The Soviet fish industry of South Sakhalin, in contrast to the Japanese, places emphasis on processing food products. This requires basic reorganization of fish processing technology.

In past years, about 1,500,000 centners of herring were caught in less than 2 weeks, while the total capacity of salting facilities was about 260,000 centners. In addition, the quality of the salting vats left much to be desired.

The Japanese cement vats are constructed very poorly. Vats in all enterprises of the Western Trust leaked and the leaks were difficult to find. The trusts also used round wooden vats (capacity about 50 centners), but even these vats needed capital repairs. Therefore, within the next 2 or 3 years at the most, vats having salting capacity of more than one million centners must be constructed.

As has been pointed out before, since the spawning places for the spring runs of herring vary, the problem of determining the location for the construction of vats must be faced.

In the event of change in the location of the catch, the fish caught may be transferred to the nearest processing enterprise. However, a well-planned relocation of the salting vats must also be considered so that long hauls can be avoided. Modifying this problem somewhat is the fact that the spring herring catch occurs during low temperatures (about 5 - 6 degrees), thus lessening the danger of spoilage.

The summer and autumn herring caught in South Sakhalin have a higher oil content than the spring variety (up to 24 percent higher). Since they are caught during the warm part of the year, this fact complicates processing. With ordinary salting methods, summer herring crack and "rust." Refrigerated salting, however, as shown by tests at the Okoo Fish Combine, yields a very fine product. The use of ice in transporting herring to the mainland would also help to prevent spoilage.

The Japanese caught a considerable number of young herring in Aniwa Bay during past years. Processing this type as a food product requires special study because it is not clear just what the safe catch of young herring would be from the standpoint of stock conservation.

Fresh-dried herring is a unique product. While having a very simple method of processing, this product maintains a high food value, showing concentration of albumen and oil. Herring processed in this way are well preserved and are entirely suitable for consumption.

However, the appearance of this product does not render it particularly palatable; therefore, the nature of this product merits careful attention of Soviet technologists.

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Refrigeration has great importance in the fishing economy of South Sakhalin. At present, methods and capacity do not adequately meet the needs of the fishing industry.

Salmon, flounder and several other types of fish can be preserved by canning, but the amount of canned goods which can be produced in South Sakhalin is limited and demands special consideration. Among problems, is the difficulty in obtaining jars, oil and other materials.

Warehouses represent the greatest bottleneck in the fishing industry of South Sakhalin. For this reason, the catch is frequently stored in open bins for several days when the temperature is high and the air is damp, remaining thus until they are loaded into refrigerators. As a result, there is inevitable spoiling.

No less grave is the need for cans, production of which is in its infancy.

The Japanese put up dried products (fertilizer, meal, herring) in bags, and a small quantity of slated products and canned goods in boxes. South Sakhalin had an abundance of timber but a shortage of available coopers for the fishing industry. Although there is some local production of barrels, several combines are now experiencing the acute need for special equipment. It is necessary to mechanize the production of barrel staves in South Sakhalin.

The Administration of Sakhalin Fishing Industry must outline fundamental principles in an over-all plan and give instructions; through trusts, as to what sort of plan the development of individual organizations must follow.

The Transport Fleet

Timely transportation of fish products to the mainland and the supplying of Sakhalin with needed materials requires adequate refrigerator, transport, and tugboat fleets.

At present, the fish industry of Sakhalin is served by refrigerators of Eastern Fish Refrigeration and steamboats of the Maritime Fleet. For the most part, this is satisfactory, but still the Administration of Sakhalin Fishing Industry should have some of its own refrigerators and transport boats. Experiences during the current year proved that it was difficult for the Sakhalin Administration to adjust its routes and schedules to those of Eastern Fish Refrigeration and Maritime Fleet. This caused delay and untimely loading of processed goods, undue handling of products in salt vats and in refrigerators, partial spoiling of products, etc. Possession of its own small fleet would eliminate a large part of these undesirable elements.

Regulation of the Industry and Fish Breeding

Japanese regulations forbade the catch of herring in the shore zones after the spawning period and also the catch of young herring. At the same time, an extensive catch of young herring was permitted in Aniwa Bay. This condition was forced on the Japanese because of economic considerations, mainly, to provide the fishermen with means for making a living after the herring changed their spawning grounds to the west bank. These considerations do not concern the Soviet fishing economy. Soviet regulations must provide: (1) opportunity for part of the school of herring to spawn; (2) guarding spawning grounds during hatching and development of fry; and (3) forbidding the catching of young.

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For the past 6 years the Japanese had practiced the art of breeding herring. Although the number of incubated eggs reached over a billion, the art of breeding, in comparison with natural propagation, had small importance. For this reason, the guarding of spawning grounds must play the main role in stock conservation.

The conservation of salmon (humpback and Siberian) in South Sakhalin also requires special attention.

Owing to the numerous, though small rivers, the guarding of the spawning school was a difficult task. Yet, this situation facilitated the catch. The Japanese, therefore, undertook the art of breeding. Fish hatcheries were constructed in main spawning rivers. Twenty-four plants were planned but only 17 were built. The catch of salmon was regulated in the coastal zone.

The Soviet fishing industry must increase the number of fish hatcheries, guard salmon from being caught in certain areas and in the downriver spawning grounds of small rivers and, as was done by the Japanese, introduce salmon into small rivers which they have not frequented previously.

Other marine life, such as crabs and sea kale, must also be conserved and their industries regulated.

Scientific Research in the Fishing Economy

Familiarization with and efficient utilization of fish and other marine products of South Sakhalin require extensive scientific research activity. The nature of the stocks in this region is not known. The open-sea dissemination of herring in summer is also unknown. Therefore, if these problems were solved, this product could be much more valuable.

The small but valuable stocks of salmon have particular need for scientific research. The sea period of the life of salmon, the effectiveness of cultured breeding, factors influential in determining the size of schools, etc., must be studied. From these studies, the main locations of salmon economy can be developed in South Sakhalin.

In organization and engineering, not only must Japanese experiments be studied, but also methods of catching herring and other fish in the open sea must be developed. In addition, problems of mechanizing catching methods must be worked out.

Special attention must be given to study of the technology of fish and other marine industries. Biochemical and technological characteristics of different types of raw materials, the most effective methods of processing under certain conditions are some of the scientific problems requiring speedy solution.

The scientific fish-management station at Rakum' must be guaranteed modern research instruments and scientific personnel.

Only through proper development of fish research can the tasks set by the Five-Year Plan for the exploitation of fishing resources of South Sakhalin be achieved.

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